REMARKS

Claim Status

Upon entry of the present amendment, claims 1-18 and 21 will remain pending in the above-identified application, with claims 1-6, 13-18 and 21 standing ready for further action on the merits, and remaining claims 7-12 being withdrawn from consideration based on an earlier restriction requirement of the Examiner.

In this Amendment, claims 1 and 13 have been amended to recite limitations previously recited in claims 19 and 20, respectively (and claims 19 and 20 have been canceled to prevent a redundancy with the amended claims), with the exception that the term "paint-film density" occurring in prior claims 19-20 has been changed to "coating layer density" in instantly amended claims 1 and 13, with the latter term finding support throughout the application as originally filed (*e.g.*, see page 6, line 20; page 11, lines 10-15; and page 13, line 17).

The present amendments do not introduce new matter into the application as originally filed. Likewise, they do not present substantial new issues for the USPTO Examiner's consideration, and moreover actually simplify issues previously outstanding. As such entry of the instant amendment and favorable action on the merits is earnestly solicited at present.

Claim Rejection under 35 U.S.C. § 112, 1st Paragraph

Claims 19 and 20 are rejected under 35 U.S.C. § 112, 1st Paragraph as failing to comply with the written description requirement.

Claims 19 and 20 have been cancelled in the instant reply, and the remaining amended claims do not recite the term "paint-film density." As such, it is submitted that the outstanding rejection is rendered moot and must be withdrawn at present.

Claim Rejections under 35 U.S.C. § 103(a)

Claims 1, 6, 13 and 18-20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over **Taniguchi et al. JP'304** (JP 2001-135304, machine translation) in view of **Moriguchi et al. US'369** (US 6,576,369).

Claims 2 and 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over **Taniguchi et al. JP'304** and **Moriguchi et al. US'369**, and further in view of **Mabuchi et al. US'432** (US 6,156,432).

Claims 6, 18 and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over **Taniguchi et al. JP'304** and **Moriguchi et al. US'369**, and further in view of **Koyama et al. US'756** (US 2004/0101756).

Claims 4 and 16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over **Taniguchi et al. JP'304** and **Moriguchi et al. US'369**, and further in view of **Sheem et al. US'087** (US 2004/0214087).

Claims 3 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over **Taniguchi et al. JP'304** and **Moriguchi et al. US'369**, and further in view of **Takami et al. US'611** (US 5,312,611).

Reconsideration and withdraw of the above outstanding rejections is respectfully requested based on the following considerations.

Legal Standard for Determining Prima Facie Obviousness

M.P.E.P. § 2141 sets forth the guidelines in determining obviousness. First, the USPTO has to take into account the factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 17,

148 USPQ 459, 467 (1966), which has provided the controlling framework for an obviousness analysis. The four *Graham* factors are:

(a) determining the scope and content of the prior art;

(b) ascertaining the differences between the prior art and the claims in issue;

(c) resolving the level of ordinary skill in the pertinent art; and

(d) evaluating any evidence of secondary considerations.

Graham v. John Deere, 383 U.S. 1, 17, 148 USPQ 459. 467 (1966).

Second, the USPTO has to provide some rationale for determining obviousness. MPEP § 2143 sets forth some rationales that were established in the recent decision of *KSR International Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007). Exemplary rationales that may support a conclusion of obviousness include:

(a) combining prior art elements according to known methods to yield predictable results;

(b) simple substitution of one known element for another to obtain predictable results;

(c) use of known technique to improve similar devices (methods, or products) in the same way;

(d) applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

(e) "obvious to try" – choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success

(f) known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;

(g) *some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.*

As the M.P.E.P. directs, all claim limitations must be considered in view of the cited prior art in order to establish a *prima facie* case of obviousness. *See* M.P.E.P. § 2143.03.

Distinctions over the Cited Art

What is described in column 25, line 10 to column 26, line 6 of **Moriguchi et al. US'369** *(reproduced below for the USPTO's ease of review and consideration - with slight reformatting to place Table 5 after Example 10)* is a packing density of graphite powder, and is not a coating layer density as that of the present invention. Thus, it is submitted that **Moriguchi et al. US'369** does not have or contain a description about a coating layer density of a negative electrode.

Packing Density

The packing density of a powder is an index as to how densely the powder can be packed in a given volume. which influences the energy density per unit volume of an electrode. For this reason, the packing density of each fraction of the graphite powder was measured in accordance with the tap density measuring method specified in JIS z2500. The tapping was performed ten times. The results were evaluated as follows:

○: packing density of 1.17 g/cc or higher,

X: packing density of less than 1.17 g/cc.

Stability on Electrode Plate

As described previously. if coarse particles exist on an electrode plate, they may penetrate through the adjacent thin separator sheet to cause internal shorts. Therefore, the size distribution of each fraction measured by the laser diffraction/scattering size distribution analyzer was checked to determine the volume percent of coarse particles having a size greater than 200 μm. The stability on an electrode plate was evaluated to be poor (X) if the fraction contained 0.5% by volume or more of coarse particles, and to be good (○) if it

contained less. Such coarse particles often have irregular shapes having a big difference between their longer and shorter diameters, and it is difficult to remove these particles by screening if their shorter diameters are smaller than the opening size of the screen used.

Example 10

A graphite powder was prepared in exactly the same manner as described in Example 2. The resulting graphite powder was classified by screening to obtain several fractions having different mean particle diameters. The number of open interstices per micrometer in the surface closed-end structure of each fraction is shown in Table 5 along with other various properties thereof, the discharge capacity and charge/discharge coulombic efficiency, packing density, and stability on an electrode plate.

A decrease in the mean particle diameter of the graphite powder, particularly to less than 5 μm, caused a deterioration in charge/discharge coulombic efficiency of the electrode and a decrease in packing density. When the mean particle diameter of the graphite was larger than 35 μm, the stability on an electrode plate was deteriorated.

TABLE 5

Ex. No.	Process	Hammer mill speed (rpm)	Number of open interstices per μm	Specific surface area (m^2/g)	Mean particle diameter (μm)	Discharge capacity (mAh/g)	Charge/discharge coulombic efficiency (%)	Packing density	Stability on electrode plate
Ex. 9	1st	7500	104	1.69	4.1	319	90	X	○
		7500	103	0.64	5.4	326	91	○	○
		7500	104	0.54	32.1	358	95	○	○
		7500	102	0.51	37.4	331	96	○	X
Ex. 10	2nd	7500	768	1.64	4.2	325	90	X	○
		7500	772	0.72	20.1	331	97	○	○
		7500	750	0.57	34.7	333	96	○	○
		7500	770	0.55	38.3	335	96	○	X

Pulverized for 5 minutes; crystallite size was 245–276Å and d002 was 3.364–3.365Å in all runs.

In the present invention, the coating layer density of the negative electrode is set at 1.5 g/cm^3 or more, which makes it possible to achieve an effect that is unexpected from the disclosures of each of **Taniguchi et al. JP'304** and **Moriguchi et al. US'369**.

More specifically, since the graphite A having a high strength hardly generates deformation caused by the press, and the graphite B contacts with and between the primary particles of the graphite A while the graphite B changes shapes freely during the press, a mixing effect of the graphite A and the graphite B can be exerted more as the coating layer density of the negative electrode is higher. In this regard, the USPTO's attention is respectfully directed to page 11, lines 5-16 of the specification *(which is reproduced below for the USPTO's ease of review):*

> *In the thus manufactured negative electrode for lithium secondary batteries, since the graphite A having a high strength hardly generates deformation caused by the press, and the graphite B contacts with and between the primary particles of the graphite A while the graphite B changes the shapes freely during the press, a mixing effect of the graphite A and the graphite B can be exerted more as coating layer density of the negative electrode is higher. The coating layer density of the negative electrode after the press is preferably 1.4 g/cm^3 or higher, and more preferably, 1.5 g/cm^3 or higher. However, when the coating layer density is excessively high, even the combination of the graphite A and the graphite B provides a low utilization rate, thus the coating layer density is preferably 1.9 g/cm^3 or lower, and more preferably, 1.8 g/cm^3 or lower.*

Notably, the remaining cited art references being relied on by the USPTO to reject the pending claims (*i.e.*, **Mabuchi et al. US'432**, **Koyama et al. US'756**, **Sheem et al. US'087**, and **Takami et al. US'611**) do not cure the above noted deficiency of **Moriguchi et al. US'369**, or otherwise have the capability of rendering obvious the unexpected effect that is associated with the instant invention as claimed, when compared with the disclosures of each of **Taniguchi et al. JP'304** and **Moriguchi et al. US'369**.

Accordingly, based on the above considerations, it is submitted that the cited art of record, whether considered singularly or in combination, fails to provide those of ordinary skill in the art with any reason or rationale that would allow them to arrive at the instant invention as

claimed, or the unexpected and advantageous properties that are possessed thereby. Any contentions of the USPTO to the contrary must be reconsidered at present.

CONCLUSION

Based upon the amendments and remarks presented herein, the Examiner is respectfully requested to issue a Notice of Allowance clearly indicating that each of the pending claims 1-6, 13-18 and 21 currently under consideration at present is allowable under the provisions of Title 35 of the United States Code.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact John W. Bailey, Reg. No. 32,881 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Director is hereby authorized in this, concurrent, and future replies to charge any fees required during the pendency of the above-identified application or credit any overpayment to Deposit Account No. 02-2448.

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Respectfully submitted,

By _____

John W. Bailey
Registration No.: 32881
BIRCH, STEWART, KOLASCH & BIRCH, LLP
8110 Gatehouse Road, Suite 100 East
P.O. Box 747
Falls Church, VA 22040-0747
703-205-8000